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Understanding mercury in building and component design, specification, remodeling and demolition

This fact sheet is adapted from a guidance document developed for demolition contractors and is subject to future revision. Examples in this document do not represent an exhaustive listing of types of materials that may contain mercury or projects to which the rules or statutes might apply.

Mercury was and is used in many devices, products, and applications that architects may specify or that contractors may purchase, use, or find in the course of building design, construction, renovation, and demolition.

Mercury and its compounds are acutely and chronically toxic to human health and the environment. Mercury disposal in solid waste and wastewater streams is **prohibited** by state and federal laws and rules; recycling is required where possible. Some mercury-containing chemicals cannot be recycled.

Specify non-mercury devices and products in new construction and renovation whenever possible

It is wise to specify and install non-mercury devices and products, especially in light of mercury's toxicity, the difficulties in locating and managing mercury properly in demolition activities, and the high costs of clean-up when it is spilled. Non-mercury alternatives are available and in commercial use for virtually every product and application except for high efficiency fluorescent and HID lighting.

Though state and federal laws generally do not prohibit mercury use in building components, state law does require most products be labeled to disclose their mercury content. In addition, state law contains provisions encouraging or requiring the manufacturers of mercury thermostats and mercury displacement relays to be responsible for their products at end-of-life.

Environmentally preferable purchasing encourages the reduction and elimination of toxic and hazardous materials in public and private purchasing, contracts and specifications.

Addressing mercury in demolition, specifications and contracts

Architects are also involved in writing demolition specifications and should be familiar with historical uses and various laws and regulations governing removal of mercury in demolition. Since state law prohibits disposal of mercury in solid waste, demolition specifications and contracts must cover the identification, removal, and proper management of mercury prior to demolition activities.

"Good Practices" in demolition

In general, do not remove elemental mercury or a component such as a switch from the device. Keep the device intact and remove and store in a covered container in a manner that will prevent breakage, spillage, or release. Store similar products together to the extent practical, as this will facilitate subsequent management, reduce breakage, and can reduce final management costs. Label containers with the words "mercury for recycling" or a similar phrase.

Most devices can be removed with simple tools, for example: a rechargeable screwdriver with slotted and phillips bits, a 6" open-end adjustable wrench, a wire cutter, and a larger cutter or tools for cutting or disconnecting tubing and flex/rigid electrical conduit. Take a few minutes to carefully remove devices intact and prevent spillage and breakage.

Elemental mercury, devices containing elemental mercury, and dental amalgam must be managed as Hazardous Waste or as Special Waste/Universal Waste (MPCA Hazardous Waste Fact Sheet #2.22). Contact the MPCA or your Twin Cities metropolitan county hazardous waste department for additional information on these regulations and programs.

If you find spilled mercury or have a spill, contact the State Duty Officer at 612-649-5451 or 800-422-0798 24 hrs/day.

If you have a device that you cannot remove properly and safely, contact the MPCA, your Twin Cities metropolitan county hazardous waste department, a hazardous waste contractor, or a mercury recycler for further assistance.

Mercury-containing products and devices

Abandoned products and wastes

- **Dental offices and laboratories:** elemental mercury, amalgam capsules, waste amalgam
- **Pharmacies and all types of laboratories:** mercury-containing pharmaceuticals and chemicals (*mer* or *merc* in chemical name); and products such as thermometers, laboratory and analytical equipment
- **Medical office buildings:** thermometers, blood pressure devices, pharmaceuticals, batteries, other
- **Neon sign manufacturing:** elemental mercury, signs and tubing containing mercury
- **General:** bulk mercury, mercuric oxide batteries, fungicides, pesticides, any of the devices listed below may be left behind by a business or manufacturing operation.

Specialty building concerns

Mercury is almost certain to be present in traps and drains in the following types of buildings and office/laboratory/storage space within buildings:

- Health care: hospitals, clinics, nursing homes, veterinary, dental
- Medical, scientific, engineering laboratories
- Schools, especially in laboratory spaces

Batteries

Mercuric oxide batteries are not rechargeable, but were commonly used in older battery-powered devices such as smoke detectors, medical devices, and security/sensor systems where the long life and reliable voltage of this type of battery were desirable. Be sure to look for stocks of new and spent batteries.

Rechargeable batteries must also be removed and properly managed before building demolition; primary uses are in emergency lighting and security systems, including all remote sensors.

See MPCA Hazardous Waste Fact Sheet #4.05.

Lighting

- Fluorescent, metal halide, high-pressure sodium, mercury vapor lamps.
- Most colors of neon — mercury is visible in tubing at low spots and near electrodes.

See MPCA Hazardous Waste Fact Sheet #4.20.

Standard HVAC wall thermostats

These must be removed with the entire housing, backing plate, and face/cover plate kept intact if you wish to send these back to Honeywell/Thermostat Recycling Corporation at no cost through your mechanical or HVAC contractor and wholesaler. Otherwise most mercury recyclers will handle them for a fee.

Gas-fired furnaces, boilers, central AC, unit heaters, space heaters, residential and commercial cooking equipment, commercial hot water heaters, industrial ovens

Mercury flame sensor in pilot light and burner assembly, for standing and spark ignition pilot.

All boiler, HVAC and walk-in cooler equipment:

Hydronic and warm air controls with tilt switches such as aquastats, pressurestats, firestats, fan limit controls, pressure/flow controls on air handling units. Also timer controls. Check any controller box attached to or part of the equipment.

Any system or tank with steam, air, or water pressure or vacuum

Safety devices such as a pressurestat or pressure-trol to prevent overpressure.

Any material handling system with float and level controls, conveyor systems

Look for mercury switches in level sensors and controls in sump/bilge pump systems, float and level controls and material handling systems. Also used in industrial conveyor counterweights.

Powerhouse, boiler, district heating/cooling lines

Mercury manometers, thermometers, gauges, control devices, instrumentation, timer controls, steam flowmeters, including some large industrial dial gauge thermometers (Moeller brand, for example) with mercury in a capillary tube. Newer manometers may have valves at the tube tops to allow removal of the manometer without spillage.

Electric utility generation and distribution controls, metering, and similar devices

Specialty switches and relays are used in control, metering, and modification of electrical load and supply in products such as phase splitters, load meters and sensors, microwave relays/transmitters, and many other products used in generation, distribution, and metering. Utilities may know where mercury devices are located, but the electrical customer will likely not know that mercury is used or present in these devices.

Industrial equipment, sump pumps and bilge pumps

Nearly any control or measurement device can contain a mercury switch or may use mercury to measure fluid level, temperature, pressure, vacuum, flow rate, or pressure differential. There are too many specialized industrial applications to list, but the items listed here give you an idea of the types of applications.

Mercury in glass thermostat or accustat

A small device that looks like a thermometer with two metal bands, used to provide precise temperature control for heating and cooling a space like a walk-in cooler.

Mercury displacement relays

Used in high-current/high-voltage applications such as lighting (including street lighting), resistance heating, commercial electric cooking appliances such as pizza ovens and deep fryers, plastics molding equipment, some motors, even pipe organs. These can and should be removed from the product or electrical control box.

Wetted reed relays

Typically found in computers, research and analytical equipment. May be present in items left in a telecommunications or telephone building.

Silent wall switches, single pole/three-way, lighted/unlighted, residential and spec grade

Made by GE, Leviton and Eagle until about 1991; no detent position can be felt in these switches, all are marked "TOP" on one mounting tab as these are positional switches.

Oddballs

- Weight/counterweight for large commercial grandfather clocks that were reportedly used in old banks, hotels, commercial buildings, etc.
- Automatic carwash equipment — contact equipment manufacturer for location and usage
- Switches in pneumatic tube and conveyor belt message systems

Some manufacturers, brand names for common items

Manufacturers and brand names for instrumentation and control devices, displacement and wetted reed relays:

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|--------------------------------------|---------------------------------------|
| • Adams and Westlake | • Johnson Controls |
| • AEC/American Electronic Components | • Lux |
| • Aleph International | • Magnecraft |
| • Comus | • MDI/Mercury Displacement Industries |
| • CP Clare | • Mercoid |
| • Durakool (AEC) | • Mercury Switches, Inc. |
| • Dwyer | • Moeller |
| • Emerson | • Robertshaw |
| • General Electric | • SJ Electro Systems |
| • Hamlin | • Terice |
| • Harper Wyman | • Watlow Controls |
| • Hermaseal | • White-Rodgers |
| • Honeywell | |

Notes: This is not a complete list. Many of these companies may have manufactured products for others. For example, Honeywell manufactures thermostats for many HVAC firms such as American Standard, Bryant, Coleman, Lennox, etc.

Thermostats thermometers, and barometers/manometers

Assume that any HVAC thermostat or glass thermometer contains mercury. Some thermometers have red or blue color in the glass or in the mercury to make the column more visible - this may fool you into thinking that the thermometer does not contain mercury. Mercury is readily visible and distinguishable in barometer/manometer applications. For thermometers, there are too many brand names to list. Some are armored or shielded and the mercury may not be immediately visible. As noted on a previous page, some industrial dial-face thermometers contain mercury in a capillary tube, and it is not visible at all.

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For more information

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